



Statistics in focus

INDUSTRY, TRADE AND SERVICES

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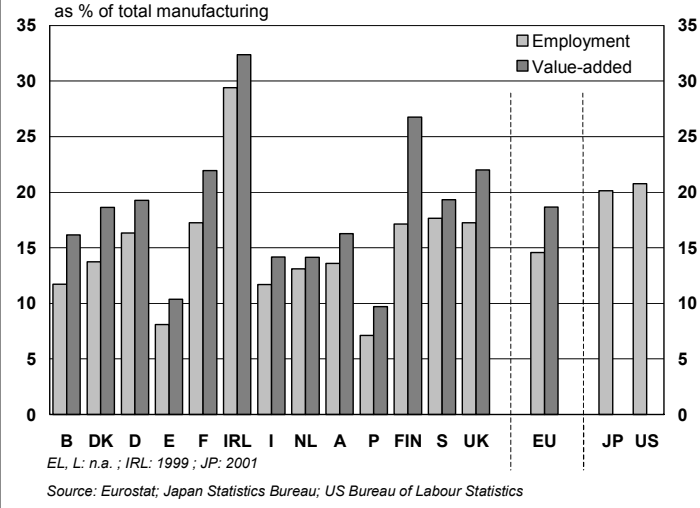
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High-tech industries in the EU

Jean Lienhardt

The term 'high tech' has been increasingly used to describe particular technologically advanced industries without there being a universally accepted definition of the term. Nevertheless, there is wide agreement about the kinds of industry which should be included in any grouping. The concern here is not with the most appropriate definition but with the main features of a group of manufacturing industries which would widely be regarded as high tech in terms of the products they produce. These industries include computers, other electrical and electronic engineering, precision instruments, aircraft and pharmaceuticals (see definition in the methodological notes).

Graph 1
Employment and value-added in high technology industries in Member States, 2000



High-tech industries so defined employed just over 4 million people, almost 15% of the total working in manufacturing, in 2000 and were responsible for value-added of EUR 271 billion, just under 19% of total manufacturing value-added (Graph 1). They are slightly less important in the EU than in either the US or Japan, where these industries, defined in the same way, accounted for 20-21% of manufacturing employment (and more of value-added though the precise figures are not available). Germany was the biggest contributor to total EU value-added produced by high-tech industries and Ireland had the highest degree of specialisation in these industries (Table 1).

Table 1: Importance of high-tech industries in the EU and Member States, 2000

Sector	Total EU employment (in 1000)	Total EU value-added (in bn EUR)	Main contributor to EU value-added	Most specialised Member State	Least specialised Member State
Pharmaceuticals (24.4)	479.1	48.9	France	Ireland	Finland
Office machinery and computers (30)	205.5	15.2	Germany	Ireland	Finland
Electrical machinery and apparatus (31)	1 388.6	72.6	Germany	Germany	Netherlands
Radio, TV, communication equipment (32)	829.5	61.2	UK	Finland	Spain
Medical, precision, optical instruments (33)	878.1	45.6	Germany	Denmark	Portugal
Aircraft and spacecraft (35,3)	337.1	27.7	UK	UK	Austria
Total high tech industries	4 117.9	271.2	Germany	Ireland	Portugal
Total manufacturing	28 253.0	1 453.1	---	---	---

Notes: EL: n.a.; IRL: 1999. The most specialised Member State is the country for which the share of total manufacturing value-added accounted for by high tech industries is highest in relation to the average share in the EU. The least specialised Member State is the country where this ratio is the lowest.

Source: Eurostat, unless otherwise mentioned.



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High-tech industries, a source of employment and value-added of varying importance

High-tech industries are of varying importance for employment and value-added across the Union. In terms of employment, according to Structural Business Statistics (SBS), they accounted for close to 30% of all those employed in manufacturing in Ireland in 1999 (no data available for 2000) and over 17% in France, Finland, Sweden and the UK in 2000. On the other hand, in Spain and Portugal, only 7-8% of those in manufacturing were employed in these industries.

The division of employment between industries within the high-tech sector also varies between Member States. Across the EU as a whole, around a third of employment in the sector was in Electrical machinery and equipment in 2000, some 20% each in Radio, TV and communications equipment and Precision instruments, just over 10% in Pharmaceuticals and just under 10% in Aerospace and some 5% - under 1% of manufacturing employment – in Office machinery and computers (Table 2). In the US, by comparison, more were employed in Aerospace and Office machinery and computers – almost twice the proportion as in the EU each case; in Japan, more in Electrical machinery and electronics. In Germany, however, Electrical machinery and equipment was significantly more important for employment than average, accounting for 7% of the total employed in manufacturing and over 40% of high-tech employment; in Ireland, 8% of manufacturing employment was in Office machinery and computers (over a quarter of high-tech jobs) and a further 5% in

Radio, TV and communication equipment; in Finland, over half of high-tech employment was in the latter sector (mostly in telephone equipment), 9% of the total in manufacturing; while in the UK, the Aircraft industry accounted for twice the EU average share of high-tech jobs and for 3% of total manufacturing employment.

The contribution of the high-tech industries to value-added was greater than their share of employment in all Member States. Their share of manufacturing value-added, therefore, ranged from almost a third in Ireland and some 27% in Finland – substantially above the employment share of 17% - to around 10% in Spain and Portugal. In relation to employment, the contribution to value-added was particularly large in respect of Pharmaceuticals, Aircraft and Radio, TV and communications equipment, especially in the last case in Finland, where this industry alone was responsible for 20% of total manufacturing value-added.

This difference in the shares of employment and value-added accounted for by the high-tech industries reflects their high value-added per person employed (which given the relative small numbers working part-time is a reasonable proxy for labour productivity). This was almost 30% higher in this group of industries in 2000 than in manufacturing as a whole, largely, as implied above, because of high levels of labour productivity, in Pharmaceuticals (twice the average for manufacturing), Aircraft (60% higher) and Office machinery and Radio,

Table 2: Employment, value-added and value-added per person employed in high-tech industries, 2000

	B	DK	D	E	F	IRL	I	NL	A	P	FIN	S	UK	EU
Division of employment in high-tech industries (%)														
Pharmaceuticals (24.4)	22.1	17.4	9.2	17.6	14.2	11.2	12.6	12.6	12.4	10.7	7.9	13.2	9.2	11.6
Office machinery and computers (30)	1.2	2.7	3.8	3.9	5.8	27.4	2.9	7.1	1.0	0.5	1.2	2.7	7.9	5.0
Electrical machinery and apparatus (31)	32.2	33.9	42.4	43.8	24.8	20.2	39.0	19.0	33.9	51.2	22.6	26.8	25.1	33.7
Radio, TV, communication equipment (32)	24.0	21.5	13.8	14.3	23.0	18.2	18.1	35.5	35.5	24.8	51.7	33.3	20.5	20.1
Medical, precision, optical instruments (33)	11.1	23.4	25.0	14.8	20.8	23.0	22.3	22.1	16.8	9.6	15.4	16.5	20.3	21.3
Aircraft and spacecraft (35.3)	9.4	1.2	5.8	5.6	11.5	0.0	5.1	3.7	0.4	3.1	1.1	7.5	16.9	8.2
Division of value-added in high-tech industries (%)														
Pharmaceuticals (24.4)	38.2	36.5	11.4	26.1	21.5	29.0	22.0	17.9	17.0	19.1	4.6	26.6	15.5	18.0
Office machinery and computers (30)	0.7	2.4	5.4	5.4	6.7	21.6	2.5	7.8	1.0	0.7	0.0	2.0	6.9	5.6
Electrical machinery and apparatus (31)	23.0	23.4	40.7	36.0	18.7	7.9	30.9	15.8	30.5	35.5	11.2	17.4	18.4	26.8
Radio, TV, communication equipment (32)	24.7	12.8	14.6	13.3	22.3	28.0	20.2	37.8	40.6	34.2	75.3	32.0	22.8	22.6
Medical, precision, optical instruments (33)	6.2	24.2	20.5	11.9	16.4	13.5	18.5	17.6	10.8	7.8	8.4	14.4	15.7	16.8
Aircraft and spacecraft (35.3)	7.2	0.7	7.4	7.4	14.5	:	5.9	3.0	0.1	2.7	0.5	7.6	20.7	10.2
Value-added per person employed (1000 EUR)														
Pharmaceuticals (24.4)	156.9	143.5	78.6	73.5	100.8	312.2	90.1	95.0	92.9	46.9	64.7	135.9	127.5	102.0
Office machinery and computers (30)	55.3	59.9	88.7	68.9	76.6	95.3	43.8	73.8	64.7	33.5	-1.1	48.8	65.7	74.0
Electrical machinery and apparatus (31)	64.7	47.2	60.7	40.8	50.0	47.3	40.7	55.8	60.8	18.3	54.8	43.9	55.7	52.3
Radio, TV, communication equipment (32)	93.1	40.6	67.0	46.2	64.2	185.7	57.2	71.4	77.1	36.2	160.3	65.2	84.1	73.8
Medical, precision, optical instruments (33)	50.5	70.8	52.0	39.8	52.2	71.3	42.5	53.4	43.4	21.4	59.8	59.0	58.6	52.0
Aircraft and spacecraft (35.3)	69.6	39.5	81.7	65.2	83.9	:	59.6	55.1	22.7	23.1	49.9	69.0	92.6	82.0
High tech industries	90.7	68.3	63.3	49.6	66.3	120.9	51.3	67.0	67.5	26.3	110.2	67.7	75.8	65.8
Total manufacturing (D)	65.7	50.4	53.7	38.7	52.2	109.8	42.3	62.1	56.6	19.3	70.6	61.8	59.4	51.4

Notes: EL, L: n.a.; IRL: 1999. The data for value-added for Ireland are not comparable with those for other Member States; NL: value-added 32, 33, estimated, 35.3 1999. See methodological notes for estimation method.

TV and communications equipment (both 44% higher). In contrast, labour productivity in Electrical machinery and Precision instruments was, on average, about the same as in manufacturing.

This pattern of variation in productivity between industries partly reflects differences in the capital intensity of production – ie in the capital employed per worker. Although it is difficult to measure this directly, the SBS data on investment per worker indicate that this was substantially higher in 2000 in Pharmaceuticals and Radio, TV and communications equipment, in particular,

than in manufacturing as a whole – around twice as high in both cases. On the other hand, investment in Office machinery was only around 20% higher than average and in Aircraft, no higher at all. In the other industries, it was below average. It also reflects, however, the skill levels of the workers employed and their relatively high levels of educational attainment, as described below. The pattern of variation in labour productivity between industries within the high-tech sector evident at the EU level was similar in individual Member States (Table 2).

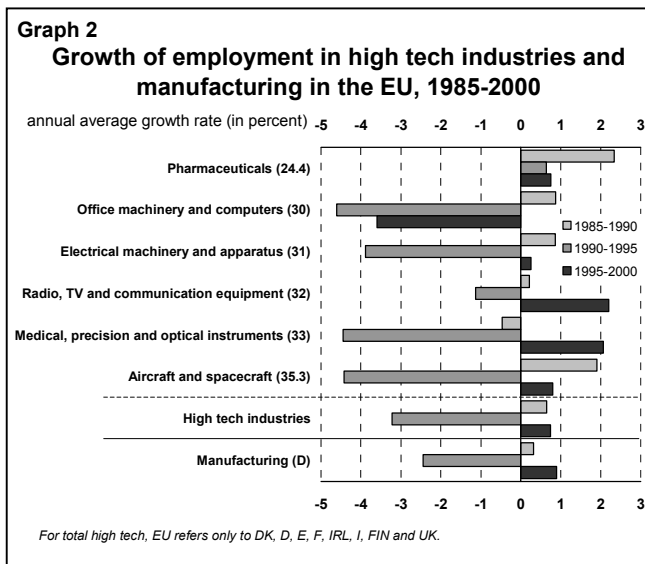
Growing employment in high-tech industries but less than in other sectors

After declining considerably during the recession years of the early 1990s (by over 3% a year), employment in the EU in the high-tech industries, taken together, increased during the last half of the 1990s at an average rate of ½-1% a year. This is similar to the rate of increase experienced in the growth years of the latter part of the 1980s (Graph 2). Despite significant productivity growth, therefore, these industries have, nevertheless, contributed to net job creation during periods of economic growth, though this has been interspersed by periods of contraction, when job losses have more than wiped out the additional jobs created during these years. In 2000, therefore, the number employed in high-tech industries in the Union was around 9% less than in 1985, at the beginning of the subsequent recovery period.

Moreover, employment growth in these industries was slightly less than in manufacturing as a whole during the latter part of the 1990s, while the contraction of jobs in the early part of the decade was greater. In both the US and Japan, by contrast, the share of employment in the high-tech industries increased in the second half of the 1990s, even though in Japan, the number of jobs declined by over 2% a year in absolute terms over this period, while in the US, it followed a significant fall in the share in the first half of the decade.

Within the EU, the growth of employment has varied both between Member States and between industries within the high-tech sector. Over the period 1995 to 2000, employment rose most markedly in Radio, TV and communications equipment and Precision instruments, at around twice the rate in manufacturing as a whole, while it increased relatively little in Electrical machinery and declined markedly in Office machinery (by around 3½% a year). In the latter industry, therefore, jobs contracted during this period of economic growth at only a slightly lower rate than in the recession years of the early 1990s.

Apart from Ireland, where employment rose substantially (by almost 9% a year), the contraction in Office machinery was common to all Member States. In Ireland, employment also increased in other high-tech industries between 1995 and 2000, as it did in most of these in most other countries, if less markedly. The main exceptions were Germany, where the number employed declined in high-tech industries taken together by over 1% a year (and by almost 2% a year in Electrical machinery, which as noted above accounted for a larger share of jobs than elsewhere), the UK, where there was a relatively large contraction in Pharmaceuticals (of almost 3% a year) as well as in Office machinery, and Italy, where, overall, employment remained broadly unchanged, but where jobs in Aerospace and Radio, TV and communications equipment, again in addition to Office machinery declined significantly.



Large enterprises particularly important in high-tech industries

High-tech industries are dominated by large enterprises, much more so than the manufacturing sector as a whole. In 2000, over 61% of employment in the EU in the high-tech industries taken together was in firms with a work force of 250 or more (compared to just over 40% in total manufacturing), while medium-sized firms with 50 to 249 people accounted for around 19%, leaving only 20% of employment in small firms of under 50 (Graph 3). Much the same division of employment is evident in most Member States, the exceptions being Denmark, Spain and, above all, Italy, where in each case, large enterprises employed around half or less of the total working in the sector and where SMEs were correspondingly more important than elsewhere. In Italy, these accounted for almost 60% of total employment, with small firms of under 50 being responsible for 40%. In Finland and Sweden, by contrast, over 70% of employment was in large enterprises and in Belgium, France and Ireland, only slightly less than 70%.

In all of the broad industries within the high-tech sector, except Precision instruments, most of those employed worked in large enterprises, both at the EU level and in all Member States, except in Denmark (where medium-sized companies dominated in Pharmaceuticals, in particular), Spain (where the majority of those employed

in Electrical machinery and equipment worked in SMEs) and Italy (where in all high-tech industries, except Aerospace and Pharmaceuticals, around half or more of employment was in SMEs) (Table 3).

The relative dominance of large enterprises in high-tech industries is a reflection perhaps of their generally higher level of labour productivity (which, it should be emphasised may be a result of a greater capital intensity in production rather than greater efficiency *per se* or a higher level of productivity once capital as well as labour inputs have been taken into account). In the high-tech sector as a whole, value-added per person employed in firms with a work force of 250 or more was some 50% higher than in medium-sized firms, which, in turn, had a level 25% higher than in small ones. A similar pattern is evident in most Member States, the main exception being Portugal where medium-sized firms had a higher level of productivity than larger ones, though it is less marked than elsewhere in Italy and Spain, where large enterprises are less important (Graph 4). A similar pattern is also evident in industries within the high-tech sector, but much less so than in others in Precision instruments, where large firms account for a relatively small share of employment.

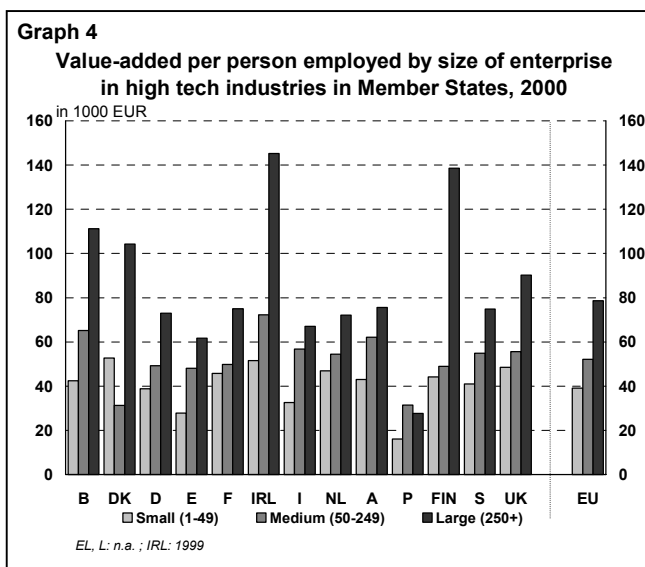
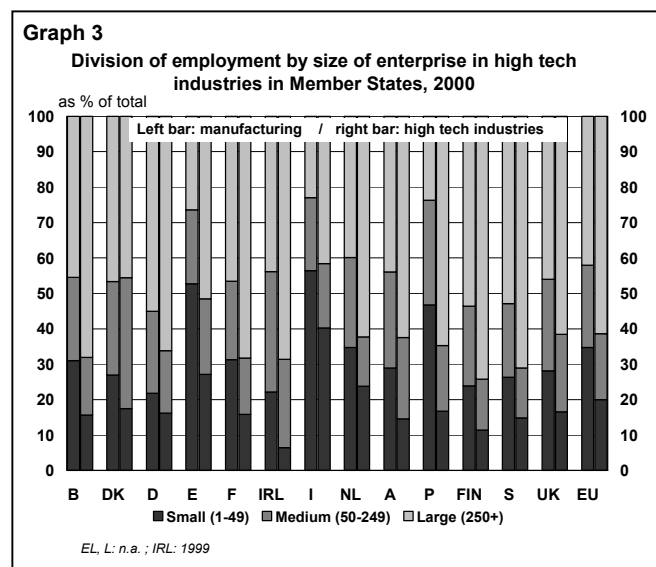


Table 3- Employment in large enterprises (250 or more employees) in high tech industries, 2000

	B	DK	D	E	F	IRL	I	NL	A	P	FIN	S	UK	EU
<i>as % of total employed</i>														
Pharmaceuticals (24.4)	83.8	18.0	85.2	63.5	80.8	59.1	69.6		61.4	37.2		90.2	86.3	76.9
Office machinery and computers (30)	0.0	0.0	73.4		84.8	84.1	34.0					44.8	65.7	69.5
Electrical machinery and apparatus (31)	65.0	55.6	70.6	47.2	65.7		31.6	43.2	56.5	67.9	55.0	63.4	46.4	57.5
Radio, TV and communication equipment (32)	83.3	64.4	75.8	57.8	74.0		51.0		90.5	81.6	90.1	85.3	66.8	71.7
Medical, precision and optical instruments (33)	16.7	47.2	38.9	27.2	38.1		24.0		17.7	36.8	51.5	44.6	40.2	36.2
Aircraft and spacecraft (35.3)		0.0	94.0	81.2	92.7		94.9						87.9	90.7
High tech industries	68.0	45.6	66.1	51.5	68.2	68.6	41.6	62.3	62.5	64.7	74.2	71.1	61.6	61.4

Notes: EL, L: n.a.; B: 31, 32, 33 estimated; DK: 24.4, 31, 33 estimated; D: 30, 32: estimated; E: 24.4, 32, 33, 35.3; IRL: 1999, 24.4, 30: estimated; I: 30, 33, 35.3: estimated; A: 24.4, 31, 32, 33: estimated; P: 31, 33: estimated; S: 31, 32, 33: estimated. See methodological notes for estimation method.

A relatively highly-qualified work force but with relatively few women

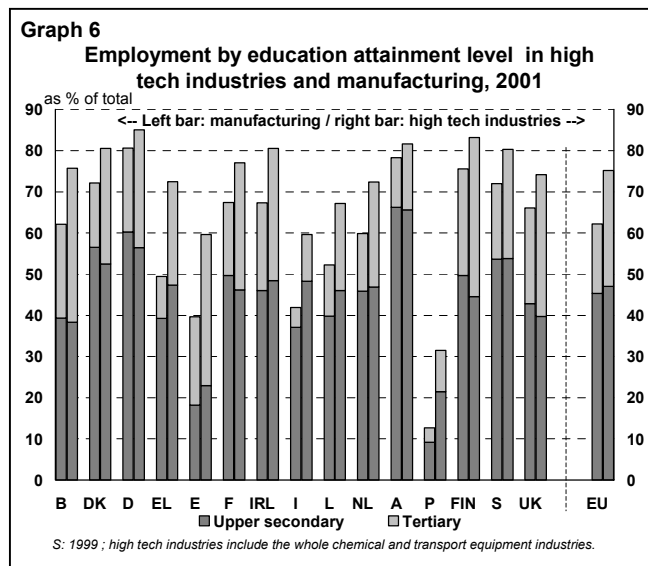
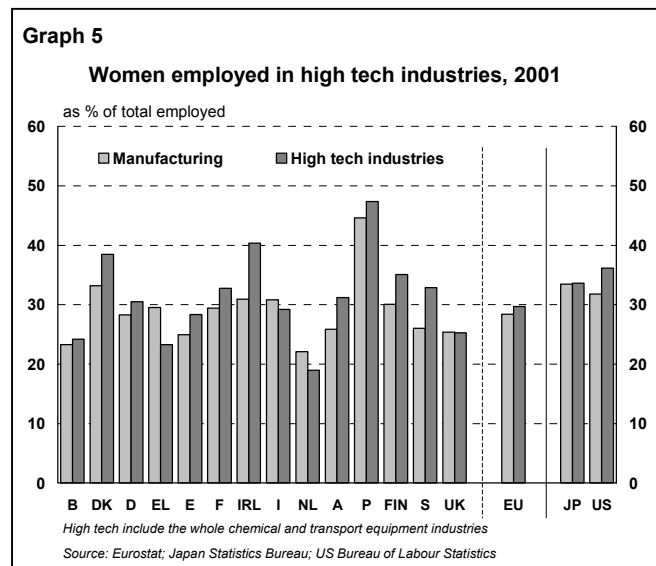
The great majority of those employed in high-tech industries in the EU, as in manufacturing as a whole, are men. In the industries taken together, around 30% of those employed are women, according to the latest data available from the Labour Force Survey (LFS) (for 2001 – the SBS data are not split by sex), slightly more than in manufacturing as a whole (Graph 5). Women account for a larger share of the work force in high-tech industries in both the US and Japan than in the EU – around 36% in the former, a third in the latter – reflecting their larger share in manufacturing as a whole.

The proportion of women in high-tech industries in the EU, however, varies from 47% in Portugal and 40% in Ireland to under 25% in Belgium, as well as Greece, and under 20% in the Netherlands. The relative number employed is similar in the different industries within the high-tech sector, except (probably) in the Aircraft industry, where women account for under 15% of employment (the LFS data relate to NACE 2-digit sectors and, therefore, it is not possible to distinguish Aerospace from the rest of the Other transport equipment industry or, indeed, Pharmaceuticals from the rest of the Chemical industry), though the number is slightly higher in Precision instruments and Radio, TV and communication equipment than in other parts of the

sector (in Portugal, they account for over 60% of employment in the latter, in Ireland, 56% in the former).

Those employed in the high-tech sector, whether men or women, have, on average, higher educational qualifications, and almost certainly higher skill levels, than those employed in manufacturing as a whole and than those employed in the rest of the economy. According to the LFS, some 28% of the work force in high-tech industries in the EU had tertiary – or university – level education in 2001, while another 47% had at least upper secondary education, leaving under 25% with only basic schooling as against 38% in manufacturing (Graph 6).

Although education attainment levels vary across the Union, in all Member States, those employed in high-tech industries have higher levels than the rest of the manufacturing work force. Equally, education levels are relatively high in all industries included in the high-tech sector, though they are lower in Electrical machinery and equipment (where a third of the work force have only basic schooling) than elsewhere and higher in Office machinery, where 40% have tertiary-level qualifications.



Exports important but the EU running a deficit in high-tech products

International trade is an important part of the high-tech industry. A large proportion of the products produced are exported while an equally large proportion of the components used in the production process are imported. Imports also account for a substantial share of the EU market for high-tech products, especially for electronic equipment of various kinds – computers, TVs, hi-fis. It is difficult to relate the data on trade directly to

the SBS data on turnover or on the value of production, mainly because the enterprises responsible for exports and imports are not all included among the enterprises manufacturing high-tech products. Nevertheless, an indication of the importance of trade in this area can be gained by relating high-tech exports and imports to total manufacturing trade flows.

In 2001, internal trade in high-tech products within the EU accounted for just under 16% of total internal trade in manufactures, slightly less than the share of the high-tech industries in total value-added in manufacturing (Table 4). Internal trade seems to be particularly important in relation to production in Office machinery and computers, accounting for just under 4% of total manufacturing trade flows between EU Member States as opposed to only 1% of manufacturing value-added.

Table 4: Share of exports, imports and value-added of high-tech products in total manufacturing in the EU, 2001

as % of manufacturing total	Imports		Exports	Value-added
	EU intra	EU extra	EU extra	EU
Pharmaceuticals (24.4)	2.5	3.1	5.1	3.4
Office machinery and computers (30)	3.6	8.0	3.4	1.0
Electrical machinery and apparatus (31)	2.2	5.0	4.9	5.0
Radio, TV, communication equipment (32)	3.7	10.3	7.2	4.2
Medical, precision, optical instruments (33)	1.6	5.1	4.6	3.1
Aircraft and spacecraft (35.3)	2.1	6.3	6.2	1.9
High tech industries	15.7	37.7	31.6	18.7

Note: extra-EU exports and imports correspond to EU trade with the rest of the world; intra-EU imports represent imports by Member States from the other EU countries, which are equivalent to intra-EU exports.

High-tech products, however, are a much more important part of the external trade of EU Member States than of trade within the EU. In 2001, high-tech products were responsible for almost a third of the total value of manufactured exports by the EU to other parts of the world, substantially more than their share in manufacturing value-added. Exports to third countries seem to account for a relatively large share of production in most of the industries categorised as high tech, but especially in Office machinery, Aerospace and Radio, TV and communication equipment.

At the same time, however, imports of high-tech products from the rest of the world account for an even larger share of total imports of manufactures into the EU than exports to third countries – almost 38% overall. Moreover, imports of Office machinery and Radio, TV and communication equipment make up a significantly larger share of total high-tech imports (almost half) than they do of EU exports (around a third).

Given the respective shares of imports and exports in total manufacturing trade, it is not too surprising that the EU had a trade deficit in high-tech products in 2001. In this year, high-tech imports from third countries exceeded EU exports to them by just under 7% - or around 3% of total trade flows (Table 5). The deficit arose principally in Office machinery and Radio, TV and audio equipment, imports being in both cases over twice the value of exports. By contrast, there were significant trade surpluses in Pharmaceuticals and Electrical machinery and smaller surpluses in Aerospace and Precision instruments.

Within the EU, Greece, Spain and Portugal had trade deficits in all or most high-tech products, as did Italy, except in Electrical machinery and Pharmaceuticals, and Austria. Ireland, by contrast, had a surplus in most products and, apart from Luxembourg, was the only Member State with a significant surplus in Office machinery. Its overall trade surplus in high-tech products, at almost 30% of the overall value of trade, was much larger than for any other country. Both Finland and Sweden, however, had relatively large surpluses, resulting to a large extent from high levels of net exports of TV and radio transmitters and telephones and related equipment.

Table 5: Trade performance in high-tech products, 2001

	B	DK	D	EL	E	F	IRL	I	L	NL	A	P	FIN	S	UK	EU
Exports-imports as a % of exports+imports																
Pharmaceuticals (24.4)	-0.5	49.5	21.4	-60.1	-29.1	11.7	68.1	1.6	-70.9	3.0	-5.1	-55.6	-39.6	48.1	12.0	29.8
Office machinery and computers (30)	-12.4	-35.7	-27.5	-79.9	-49.3	-26.3	30.6	-44.0	18.3	3.6	-32.8	-62.1	-58.1	-53.1	-11.5	-34.8
Electrical machinery and apparatus (31)	-4.5	17.5	13.2	-41.1	-7.7	10.7	4.4	8.9	1.7	-3.8	1.2	1.4	7.1	0.0	-2.4	5.4
Radio, TV and communication equipment (32)	0.6	-10.4	-2.3	-65.0	-35.2	3.5	10.2	-18.0	-0.4	-4.5	-2.9	-15.5	37.5	21.5	4.2	-11.8
Medical, precision and optical instruments (33)	-16.2	25.8	20.9	-82.4	-46.0	-4.9	31.2	-12.5	-13.9	7.7	-13.4	-60.0	13.7	5.0	-2.1	1.1
Aircraft and spacecraft (35.3)	17.3	-34.5	8.8	-78.6	-7.9	10.2	-67.8	-9.1	-85.4	-17.1	-7.9	-38.4	-36.0	1.7	8.3	4.9
High tech industries	-3.8	7.8	4.3	-65.4	-29.6	3.9	29.1	-10.8	-0.9	0.7	-7.4	-28.6	15.4	10.6	1.1	-3.2
Total manufacturing (D)	6.7	3.9	13.2	-45.9	-9.1	1.8	25.4	8.9	-5.3	6.1	-1.8	-17.2	22.2	13.2	-10.5	5.7

Notes: Member States: intra- and extra-EU trade, EU aggregate: extra-EU trade only

➤ ESSENTIAL INFORMATION – METHODOLOGICAL NOTES

SYMBOLS

“.”not available

DEFINITIONS

High-tech industries

High-tech industries can be defined in various ways – relatively narrowly, to limit the coverage to only those industrial activities which are at the forefront of technology in terms of both the products manufactured and the processes of production used, or relatively widely, to include products further away from the technological frontier. Whatever the precise definition chosen, the industries covered will tend to change over time as technology advances.

The industries included in the analysis are as follows:

24.4 Pharmaceuticals, medicinal chemicals and botanical products

DL Electrical and optical equipment

30 Office machinery and computers

31 Electrical machinery and apparatus n.e.c.

31.1 Electric motors, generators and transformers

31.2 Electric distribution and control apparatus

31.3 Insulated wire and cable

31.4 Accumulators, primary cells and batteries

31.5 Lighting equipment and electrical lamps

31.6 Electrical equipment n.e.c.

32 Radio, television and communication equipment and apparatus

32.1 Electronic valves and tubes

32.2 TV and radio transmitters, apparatus for telephony

32.3 TV and radio receivers, sound or video apparatus

33 Medical, precision and optical instruments, watches and clocks

33.1 Medical and surgical equipment

33.2 Instruments for measuring, checking and testing

33.3 Industrial process control equipment

33.4 Optical instruments and photographic instruments

33.5 Watches and clock

35.3 Aircraft and spacecraft

Number of persons employed: defined as the total number of persons who work in the observation unit (including working proprietors and partners working regularly in the unit and unpaid family workers), as well as persons who work outside the unit who belong to it and are paid by it. It includes seasonal workers, apprentices and home workers who are on the pay-roll. The observation unit for aggregating data is the enterprise, which is defined as *‘the smallest combination of legal units that is an organisational unit producing goods or services, which benefits from a certain degree of autonomy in decision-making, especially for the allocation of its current resources’*.

Value-added: Value-added is measured at factor cost; it is the gross income from operating activities after adjusting for operating subsidies and indirect taxes (including value-added tax).

Educational attainment levels: Educational attainment levels are based on the International Standard Classification of Education (ISCED), as

revised in 1997. This divides education into 7 main levels, grouped into three levels in the analysis:

- basic schooling, defined as ISCED levels 0 to 2, pre-primary, primary and lower secondary education
- upper secondary, defined as ISCED levels 3 and 4, upper secondary and post-secondary, non-tertiary education
- tertiary, defined as ISCED levels 5 and 6, first stage of tertiary education and second stage of tertiary education

The data are taken from the EU LFS, which classifies those employed to NACE 2-digit industries but not to a more detailed level. In this case, therefore, employment in the whole Chemicals division (NACE 24) and the Other transport equipment division (NACE 35) have been included in the definition of high-tech industries on the implicit assumption that education attainment levels in these reflect those in Pharmaceuticals and Aerospace.

Estimating missing values

In order to make the data used in the analysis as complete as possible, some figures missing in the SBS have been estimated. These are indicated in the notes to the tables. These missing data are often not published because of problems of confidentiality. The method used to estimate them largely through the use of residuals. If, for example, the figure for one or more NACE divisions within a NACE sub-section is missing or for one or more groups within a division, it is estimated by, first, deducting the figures for the divisions or groups which are available and then allocating the residual between the ones for which data are missing. This allocation is based either on the data for a previous year – in practice, either 1999 or 1998 or, if there are no such data, on the distribution of the variable concerned between the missing sectors in the rest of the EU. The same method is used to estimate missing values for size-classes of enterprise.

DATA SOURCES

Structural Business Statistics (SBS): collected within the framework of Council regulation on structural business statistics (Regulation (EC, EURATOM) No. 58/97 of December 1996. The SBS Regulation governs the transmission of data to Eurostat from the reference year 1995 onwards and, in principle, covers all market activities in sections C to K and M to O of NACE Rev. 1, but, in practice, the data available are confined sections C to K, excluding section J, financial services. For further information, visit: http://forum.europa.eu.int/Public/irc/dsis/bmethods/info/data/new/main_en.html

Labour Force Survey (LFS): a survey of private households which provides data on the population living in these by nationality and by work status as well as by sex and age. The main focus is on employment, unemployment and inactivity and the various aspects of these, including the sector of activity in which people are employed and the highest level of educational attainment reached.

COMEXT: Eurostat’s reference database on external trade statistics. Data for Member States are broken down by detailed product group, which in the analysis have been aggregated to correspond as closely as possible with the products produced by the industries defined as being high-tech.

Further information:

➤ Databases

New Cronos : SBS/enterpr and LFS
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